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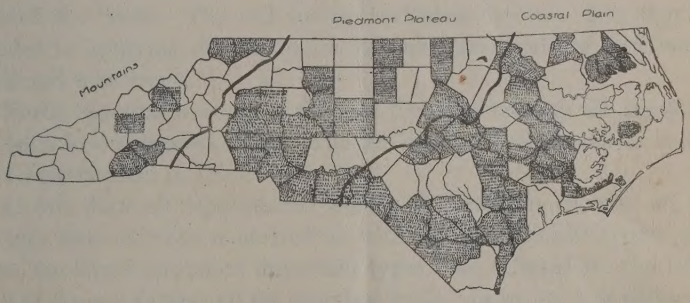
HOW NORTH CAROLINA SOIL SURVEY IS BEING USED TO HELP THE FARMERS



MAP SHOWING SOIL SURVEY AREA OF NORTH CAROLINA

The shaded areas show counties and districts which have been surveyed. The work is being done by the Division of Agronomy of the State Department of Agriculture in cooperation with the Bureau of Soils of the Federal Department of Agriculture.

Raleigh and West Raleigh, North Carolina

HOW THE NORTH CAROLINA SOIL SURVEY IS BEING USED TO HELP THE FARMERS

By C. B. WILLIAMS, Chief,
Division of Agronomy.

At the present time a great many definite and serious problems are confronting the farmers of North Carolina. But perhaps none other is of as great economic importance as is that of soil fertility. In order carry on soil investigations systematically and logically in any State, it is necessary to have the different soils mapped and analyzed. The mapping and analysis of the soils is as basic in soil investigations as is the carrying on of the field work, because it will not be possible to conduct the field work intelligently and apply the results rationally unless one knows the soil conditions in the different localities of the State. The soil survey furnishes the very data that is needed in applying the results of the field investigations, both with soils and with crops.

North Carolina was one of the first States to take up the study of its soils in a systematic way. The Division of Soils began to study and classify them in 1899.

In this State all experimental work with fertilizers on soils and of variety tests of crops is carried on with reference to soil types. At first, the larger and more important types were selected for the location of the test farms and the outlying fields. Later on, it is planned, as rapidly as funds are available for carrying on the work, to extend the investigations to the agricultural types of the State that occur in less extended areas. It can readily be seen that in such a plan that after definite information has been secured from the field, the results may generally be applied to most all the farms located on the same type of soil; it matters not how widely separated within the State the soils of the same type may be from the one on which the experiments were conducted.

The following are some of the ways in which the Soil Survey has proven valuable in the agricultural work being carried on by State and Federal governments:

1. It provides County Agents and other Extension workers with definite first-hand reliable information with reference to the general agriculture existing in the county and section in which he is working.

2. It provides all agricultural workers with a definite basis on which to apply results that have been secured in experimental work on different types of soil. For example: Let us suppose that John Smith buys a farm in Scotland County. On referring to the soil survey report of that county, he finds that the type of soil on which his farm is located is known as Norfolk sandy loam. From the soil survey report, he will learn, too, what crops have been found and are considered to be best adapted to the soil of his farm. He may also get a good general idea from the report as to the best system of crop rotation to adopt, and of the methods of cultivation and fertilization to use with the different crops he is to grow. By inquiring of the Experiment Station or State Department of Agriculture, he will find that on this same type of soil in Edgecombe County a test farm has been established and that fertilizer and other experiments are being conducted and have been for a good many years past. From the bulletins issued, giving the results of these experiments, a copy of which he may secure without cost, upon request, he will be able to learn what are the general deficiencies of his soil and what he had best use in the way of commercial fertilizers in order to secure the best paying results; for instance, with cotton and corn, which are two of the main crops being grown on the Norfolk series of soil at the present time in the State. In addition to this information which Mr. Smith may secure from the publications of the institutions above mentioned, he may also obtain other publications from the same sources, giving the results of variety test of corn, soybeans, peanuts, cotton, and practically all other crops that are generally grown in the section in which he has recently located. Besides this, he will be able to secure the following publications which deal with problems, the solution of which is essential for successful farming on the Norfolk sandy and Norfolk fine sandy loam types of soil of the State in his section and in other parts:

Bulletin No. 217—North Carolina Department of Agriculture, Variety Tests of Cotton.

Bulletin No. 230—North Carolina Experiment Station, Variety Tests of Corn.

Bulletin No. 231—North Carolina Experiment Station, Variety Tests of Cotton.

Circular No. 30—North Carolina Experiment Station, Oats for North Carolina.

Extension Circular No. 9—The Soybean in Eastern North Carolina.

Extension Circular No. 15—Crimson Clover.

Extension Circular No. 16—Hairy Vetch.

Extension Circular No. 17—Grass Mixtures for North Carolina Pastures.

Extension Circular No. 20—Bur Clover for Improvement of Coastal Plain Soils.

Extension Circular No. 24—How to Use Lime on the Farm.

3. Frequently farmers have been met who were living on a certain type of soil and who were spending their time and money experimenting on some problem which had been worked out many years before by some one connected with the State or Federal departments. Time and money might have been saved him had he known that certain results published by the Station or Department for a certain type of soil were directly applicable to his farm, as his soil was of the same type mentioned and had the same needs for the most profitable handling in the growing of crops.

4. Many times a farmer in writing for information wants to describe his soil. If a soil survey report for his county is available, it is invaluable in this respect, as is shown by the following inquiry recently received by one of the workers in the Division of Agronomy:

"Please permit me to ask a question or two. I was asked to give a description of my farm, and one question is: 'What kind of soil?' Now, I was told that you know what our soil is called, loam, clay, or what kind of soil is it?"

Where a soil survey report has been made of the county from which such an inquiry comes, it is not only possible to tell the man what his type of soil is, if he has given the loca tion of his farm, but it will be possible to advise him intelligently and reliably with reference to the best plan to follow in the treatment and management of his land for different crops, because we will know by looking up the location of his farm on the map not only what his type of soil is, but also what it contains and what its fertilizer requirements

are, since, if it is one of our leading types of soil, we have results of carefully planned and carefully conducted experiments to guide us in making our recommendations. All there will be to do then will be to apply to his particular case with any crop the results which have been secured in field experiments on the same type of soil with these different crops.

5. Farmers are demanding definite information at the present time from extension workers. The soil survey reports, together with auxiliary publications, are the only sources to supply this information. The Extension workers must not only refer the farmers to these publications, but in many cases it is up to him to interpret and help the farmer to apply the information they contain. For example: If the data secured from chemical analysis in soil survey work shows that the Cecil sandy loam type of soil of the Piedmont area of the State contains less on an average than 1,000 pounds of nitrogen per acre in the surface soil, 6 2-3 inches deep, it is up to the Extension worker to make known the fact to the farmer that the best producing soils of the United States contain much more nitrogen per acre than this, some of them running as high in content of nitrogen as 7,500 pounds, and to tell him actually what this figure tells about the stock of this constituent in the soil. Tell him whether his soil is well or poorly stocked with this constituent. Not only this, but, being familiar with the results secured in field experiments on this type of soil, he will know that from these experiments that the chief requirement of his soil, as well as of other unimproved Cecil soils is for applications of nitrogen for such crops as corn, cotton and small grains in order to get the largest and best paying yields.

It will be not only the business of the Extension worker to help the farmer understand the conditions existing in his soil, and its primary needs, but it will be up to him to help the farmer to understand how he may handle his farm in such a way as to most quickly and economically secure the required nitrogen, either from commercial fertilizers or manure, or by the growing and turning under of leguminous crops grown in rotation with other crops.

6. The analyses of the Cecil series of soils, gathered in the State Soil Survey, have shown them to be quite low in phosphoric acid; in fact, as a general thing, the quantity is so low that by the growing of maximum crops for more than fifteen to twenty years the total phos-

phoric acid present in the soil would be exhausted. With soils of this type, it is therefore absolutely necessary in most cases to make applications of phosphoric acid in available form if large yields are to be secured for any length of time, and it matters not how liberally the other plant-food constituents are supplied. Without the careful mapping of the soils, it would not be possible to know the extent and boundaries of these soils, except in the most general way. One would always be uncertain as to whether the results he has used as a guide in his answer to an inquiry from a farmer are absolutely applicable to the conditions prevailing on the inquirers' farm, and which advice usually means much to the farmer himself, unless the adviser has a soil survey report and map on which to rely.

7. In the eastern portion of the State there is found an increasingly important type of soil, known as "black" or muck soil. Where this soil has been surveyed and mapped, it will be possible to take the results from our Test Farm at Wenona and apply them directly to the farms that have this character of soil. At the present time we have enough information from our results at the Wenona Farm to justify all the expenditures that have been made there and in soil survey work in the whole of the eastern portion of the State. The information we have is of immediate and direct practicable value to all those who have farms of this type of soil which have just recently been brought under cultivation. It has clearly been demonstrated at the Wenona Test Farm that the liberal use of all forms and combinations of fertilizer used did not prove profitable until lime was added. As a matter of fact, in many cases the fertilizers depressed the yields unless the sourness existing in these soils had first been corrected by the use of lime. For these soils in this present condition, at least two tons of lime will have to be used before their sourness is entirely overcome and they are put in condition so that crops can make the most satisfactory growth.

8. Another value of the soil survey is that it gives those who are growing specialized truck or farm crops an idea as to where they may find these same soils in their own communities or elsewhere in the State should they desire to extend their operations or move from one section to another. Not only this, but it supplies the State Department of Agriculture and Experiment Station with information so that they may advise with reference to why certain communities or

sections are specially adapted to the growing of particular crops. The Extension or other agricultural worker may take this information and use it safely and intelligently from the soil survey reports that might be on file in his office.

It may therefore be seen from the above that without a soil survey it is neither possible to properly locate experimental farms or fields nor to intelligently apply the results from the experiments to the farms of the State; and that without reliable data from properly located and conducted experimental fields as fountain-heads, the Extension worker is more than likely to become a talker in generalities.